Review Game: Algebra

March 10, 2024

(1 point) NASA's Perseverance Rover was launched on July 30, 2020. After traveling 292,526,838 miles, it landed on Mars in Jezero Crater about 6.5 months later. Which of the following is closest to the Rover's average interplanetary speed in miles per hour?

(A) 6,000 (B) 12,000 (C) 60,000 (D) 120,000 (E) 600,000

(2 points) Nicolas is planning to send a package to his friend Anton, who is a stamp collector. To pay for the postage, Nicolas would like to cover the package with a large number of stamps. Suppose he has a collection of 5 -cent, 10-cent, and 25 -cent stamps, with exactly 20 of each type. What is the greatest number of stamps Nicolas can use to make exactly \$7.10 in postage? (Note: The amount \$7.10 corresponds to 7 dollars and 10 cents. One dollar is worth 100 cents.)

(A) 45 (B) 46 (C) 51 (D) 54 (E) 55

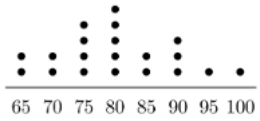
(3 points) Four numbers are written in a row. The average of the first two is 21 , the average of the middle two is 26 , and the average of the last two is 30 . What is the average of the first and last of the numbers?

(A) 24 (B) 25 (C) 26 (D) 27 (E) 28

(4 points) How many different real numbers satisfy the equation $(x^2-5)^2 = 16$?

(A) 0 (B) 1 (C) 2 (D) 4 (E) 8

(5 points) Mr. Ramos gave a test to his class of 20 students. The dot plot below shows the distribution of test scores.



Later Mr. Ramos discovered that there was a scoring error on one of the questions. He regraded the tests, awarding some of the students 5 extra points, which increased the median test score to 85 . What is the minimum number of students who received extra points? (Note that the median test score equals the average of the 2 scores in the middle if the 20 test scores are arranged in increasing order.)

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

(6 points) The real number x satisfies the equation $x + \frac{1}{x} = \sqrt{5}$. What is the value of $x^{11} - 7x^7 + x^3$?

(A) -1 (B) 0 (C) 1 (D) 2 (E) $\sqrt{5}$

(7 points) How many ordered pairs of integers (m, n) satisfy the equation $m^2 + mn + n^2 = m^2n^2$?

(A) 7 (B) 1 (C) 3 (D) 6 (E) 5